



The Pasig-Marikina River embankment upgraded through JICA support

# Supporting Flood Control Measures in Metro Manila

**The Japan International Cooperation Agency (JICA) has supported forward-thinking measures against flooding in developing countries for many years. In the Republic of the Philippines, JICA has been offering support to reduce flood damage in metro Manila to become the foundation of urban development.**

## SAWAJI OSAMU

**I**N Japan, where about 75% of the land is covered in mountains and where people and assets are concentrated in the plains, there is great risk of serious damage occurring if rivers overflow during heavy rainfall. Rivers across Japan have therefore been managed through the construction of dams, river walls, embankments, drainage canals, and more, and this has become the foundation for urban development.

JICA has been providing support to reduce flood damage in developing countries as official development assistance (ODA) by utilizing these Japanese experiences and technology. One of these projects is an improvement project for the Pasig-Marikina River which flows through the Manila capital region in the Republic of the Philippines.

The Pasig-Marikina River starts in the mountains in north-eastern Manila and flows through the capital region and into the Manila Bay. A variety of facilities are concentrated along the river, including government-affiliated organizations, shopping malls, universities, and parks, making it a familiar river

to the Filipino people. However, as it is a large river that flows through urbanized low-lying areas, serious flood damage has occurred several times due to large-scale typhoons.

Because of this, the Japanese government is offering long-term support for measures against flooding in the Manila capital region in response to a request for support from the Philippine government. The Pasig-Marikina River Channel



Aerial view of the Pasig-Marikina River and the Manila capital region

## The Pasig-Marikina River embankment, where construction progresses utilizing Japanese technology



Improvement Project is currently underway. Since 1999, this project has progressively improved the river starting downstream through the yen loan scheme.

“Metro Manila faces the same water control issues and risks as Tokyo or Osaka, which are large cities that developed on plains spreading across estuaries. We are supporting flood control measures in Manila by utilizing the flood control experience and technology developed in Japan,” says Nemoto Shin, who was dispatched to the Department of Public Works and Highways (DPWH) as a JICA expert in flood control.

With the Pasig-Marikina River Channel Improvement Project Phase IV, which began in 2019, Japanese companies have been widening and dredging the river as well as constructing embankments, river walls, and drainage facilities. Advanced Japanese technologies, such as the hat-shaped steel sheet



### Creating hazard maps with residents

Photo: Courtesy of CTII

pile + H-shaped steel method (Hat + H)<sup>i</sup> and the water jet and vibro-hammer method<sup>ii</sup>, have been introduced in river improvements, and these methods have contributed towards reducing vibrations of the ground and noise and shortening the construction period of the project while also reducing the need to acquire riverside land.

JICA offers support for not only these structural, but also non-structural measures. For example, they have created flood hazard maps and worked with residents to verify escape routes so that nearby residents can understand flood risks.

They have also provided long-term support to improve DPWH’s flood control technology and human resource development to improve technical capabilities in carrying out flood control projects. The Flood Control and Sabo Engineering Center (FCSEC), which was established in 2000 by DPWH through support from JICA, plays a central role in improving Philippine flood control technology in particular as an organization that

trains engineers, handles hydraulic tests, and creates technical standards and manuals for planning, designing, construction supervision, and maintenance related to flood control and *sabo*<sup>iii</sup>.

“JICA has provided technical guidance by continuously dispatching flood control engineers from Japan to governmental organizations in the Philippines since the 1980s. I think that the personal relationships that have developed over many years and the achievements in quality work and construction by Japanese companies have led to a very high level of trust in Japan,” says Nemoto.

In developing countries that have seen rapid economic development, urban development often moves forward without sufficient consideration of the risks of natural disasters. When a disaster occurs in these places, people and infrastructure are seriously damaged, and socio-economic activity comes to a halt. To minimize the damage caused by a disaster, it is important to carry out “prior investment in disaster risk reduction,” which identifies disaster risks and takes disaster risk reduction measures before the disaster occurs.

“JICA has supported the advancement of structural and non-structural measures in the Philippines through investing in prior investment in disaster risk reduction, including establishing flood control plans, human resource development, and financial cooperation,” says Sakai Kenta of JICA’s Global Environment Department. Typhoon Ulysses made landfall in the Philippines in November 2020, causing flooding in metro Manila, but through these measures, it is estimated that damage was reduced by around 85% based on expected damage.

“The Philippine government also understands the importance of investing in disaster risk reduction beforehand both to protect human life and for sustainable economic growth, and in recent years, they have increased their budget,” says Sakai. There has been an increase of more than 10 times the budget for flood control measures alone between 2011 and 2018.

“I hope that we can strengthen technical capabilities and focus our efforts on supporting human resource development in the Philippines in the future so that officers who are in charge of disaster risk reduction can make plans, reduce disaster risks, and engage in safe urban development on their own to tackle intensifying natural disasters by some causes such as climate change effects,” says Sakai. 

i Sheet piles are board-shaped piles driven into the ground to prevent soil from giving way and keep water from entering. Hat + H is a steel sheet pile method combining high rigidity and efficiency by integrating a hat-shaped steel sheet pile welded to H-shaped steel. This method is used for river walls, harbor piers, and more.

ii The water jet and vibro-hammer method drives piles into hard ground by combining a high-pressure water jet at the pile tip with vibrations from a device known as a vibro-hammer.

iii *Sabo* refers to the prevention of soil collapse and run off in mountainous areas, river banks, etc.